METHOD AND APPARATUS FOR ASSOCIATING INFORMATION WITH AN OBJECT IN A FILE

FIELD OF THE INVENTION

The present invention relates to searching, and more particularly to methods
and apparatus for scheduling and performing a search to associate
information with an object in a file.

BACKGROUND OF THE INVENTION

With the proliferation of the Internet, a wide variety of search engines and
search tools for locating information have become available. Typically, a user
accesses a web page containing a search form from a search engine, inputs
search terms into the form, and clicks on an icon labeled "search" or "start" for
example, to transmit the search terms back to the search engine. The search
engine then searches one or more databases for information containing the
search terms, and accesses to the user one or more web pages containing
the search results, typically represented by hyperlinks containing universal
resource locators (URLs) identifying locations or addresses on the Internet
where the information identified by the search engine may be found.

Disadvantageously, each time a user wishes to update a search he or she
has previously performed, the user must usually return to the search engine's
web page, complete the search form by inputting the same search terms as
the previous search, then sift through the search results. Often, the user will
have already seen most of the search results during the previous search.
Accordingly, such updating is often a tedious and time-consuming process
involving redundant effort, as the user has to repeatedly fill out the same
search form and sift through the same results.

One recent search engine improvement involves a utility residing in a
Windows system tray of a user's computer, which allows a user to manually
initiate a search by pressing the Alt key then clicking on a word in an

electronic document. The utility transmits the selected word over the Internet to a particular search engine, which then searches its databases for occurrences of the word. However, the search must still be manually initiated, and no apparent provision is made to eliminate redundant or old information that may have been previously retrieved. In addition, the user is required to first download and install the utility, which may not be feasible or permitted at a remote location such as a public access Internet kiosk, for example.

At the same time, electronic calendars such as desktop-based or web-based calendars are increasing in popularity. Many people, particularly business travelers, find it convenient to store a list of all of their scheduled meetings, appointments and tasks on a web-based calendar, to allow them to access this information from any computer terminal anywhere in the world which is connected to the Internet. Many such users would find it desirable to obtain up-to-date information about a person or company immediately prior to meeting with that person or company. However, meetings are often scheduled a week or more in advance, and accordingly, if a user performs a search at the time of scheduling, the search results may be out of date by the time the scheduled date of the meeting arrives. The user may intend to manually perform such a search shortly before the meeting, however, the user may be too hurried to interact with a search engine on the morning of a meeting, or may forget to do so.

Accordingly, there is a need for way to pre-schedule searches to be automatically conducted at a pre-scheduled time, such as several hours before a scheduled meeting, for example, and to conveniently provide the results of the search to a user.

SUMMARY OF THE INVENTION

The present invention addresses the above need by providing a method and apparatus for associating information with an object in a file. The method and apparatus cooperate to associate a search key with the object in the file and to

schedule a search for information using the search key for further execution by a searching mechanism operable to execute scheduled searches.

For example, where the file is an electronic calendar and the object is the name of a person or other entity in a calendar entry, with whom a user of the calendar is scheduled to meet, the user may associate a search key designed to locate up-to-date information about that entity with the calendar entry. The user may design the search key so as to exclude information older than a certain date, or to otherwise refine the search. The user may schedule a search for information relating to the entity to be conducted at a pre-scheduled time prior to the meeting, such as three or four hours beforehand, for example. The search results may then be incorporated directly into the electronic calendar, so that when the user consults the calendar, the calendar contains hyperlinks to information relating to the entity, such as a recent news story relating to the entity, for example. The user may then simply click on a hyperlink in the user's calendar to access such information.

Additionally, if desired, the user may schedule recurring searches. For example, to obtain information on a topic relevant to monthly planning meetings, the user may schedule a recurring search to occur shortly before each meeting, and if desired, may combine such recurring searching with search refinements to exclude information more than a month old, for example.

More broadly, embodiments of the invention provide for such scheduled searching for information related to any object in any file, not merely an entity in a calendar entry of a calendar. Embodiments of the invention may be implemented in a variety of physical structures, such as a desktop computer, or may be entirely implemented in a web server such as a web-based calendar server, for example.

Associating a search key with the object may involve tagging the object and the object may be a string of text in a hypertext mark-up language (HTML) document, for example.

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Scheduling the search may involve storing the search key in association with a time of execution at which the search is to be executed and in association with a tag identifying the object.

A method and apparatus according to another aspect of the invention involve
5   initiating a pre-scheduled search for the information at a pre-scheduled time using the search key associated with the object and associating with the object a result of the search.

Initiating the search may involve invoking a search engine, which may involve addressing a universal resource locator (URL) associated with the pre-
10   scheduled search. A program, subroutine, or scripts for example, may be run to populate search engine fields of the search engine to identify search parameters. A results URL produced by the search engine may be received by the apparatus and stored in association with the pre-scheduled search. A hyperlink may be associated with the object, the hyperlink pointing to the results
15   URL to enable a user to quickly access information associated with the object.

In one embodiment, a table is produced, the table associating an object tag, the search key, the pre-scheduled time, the URL associated with the pre-scheduled search and the results URL with each other to identify the search.

The above methods may be executed by a processor circuit running under the
20   direction of program codes which may be received from a computer readable medium such as a hard drive or a compact disc, for example, or which may be received as programmed code segments in a signal embodied in a carrier wave received through a wireless modem, or from the internet, for example.

Other aspects and features of the present invention will become apparent to
25   those ordinarily skilled in the art upon review of the following description of specific embodiments of the invention in conjunction with the accompanying figures.

BRIEF DESCRIPTION OF THE DRAWINGS

In drawings which illustrate embodiments of the invention,

Figure **1**   is a block diagram of a system in which an apparatus for associating information with an object in a file according to a first embodiment of the invention is employed;

Figure **2**   is a schematic representation of a calendar user profile used and modified by the apparatus shown in Figure **1**;

Figure **3**   is a pictorial representation of a display produced on a monitor of the apparatus shown in Figure **1**;

Figure **4**   is a flow chart of a search scheduler routine executed by a processor of the apparatus shown in Figure **1**;

Figure **5**   is a tabular representation of a search table stored in memory of the apparatus; and

Figure **6**   is a flowchart of a search executor routine executed by the processor of the apparatus shown in Figure **1**.

DETAILED DESCRIPTION

Referring to Figure **1**, an apparatus for associating information with an object in a file according to a first embodiment of the invention is shown generally at **10**. The apparatus includes a processor **12** and a memory **14** in which is stored an applet **16** including a first code segment **18** for directing the processor **12** to function as a search scheduler. The search scheduler includes an association component **20** for associating a search key with an object stored in a file **22** stored in a file memory **24** accessible by the processor **12**. In addition, the search scheduler **18** has a scheduling component operable to schedule a search for information using the search key for automatic future execution of the search by a search executor

implemented by a second code segment **26** running on the processor **12**, to initiate scheduled searches.

In this embodiment, the applet **16** is run in connection with a browser **28** which directs the processor **12** to establish communications through a communications interface **30** and an internet **34** to a server **36**. In this embodiment, the communications interface **30** includes a cable modem or other local area network in direct communication with the public Internet. Alternatively, the communications interface may include a modem in communication with the server **36** and the Internet **34** via the public switched telephone network **32**. Alternatively, the communications interface may include a modem operable to communicate with the server **36** through a wireless network 33.

In this embodiment, the server **36** hosts a calendar application, which provides calendar functions to a user of the apparatus **10**. Effectively, the calendar server **36** provides to the apparatus **10**, a calendar user profile **38** best shown in Figure **2**.

Referring to Figures **1**, **2** and **3**, the calendar user profile **38** provided by the calendar server **36** shown in Figure **1** includes a calendar format template **40** and calendar information **42** which is used to populate the calendar format template, with which the browser **28** shown in Figure **1** interacts to produce a calendar display such as that shown at **44** in Figure **3**, on a monitor **46** controlled by the processor **12** in Figure **1**.

In this embodiment the calendar format template **40** and the calendar information **42** present to the browser **28** shown in Figure **1** a hypertext markup language (HTML) file including various objects such as textual strings, graphics or other components for causing the browser **28** to direct the processor **12** to produce the calendar display **44** shown in Figure **3**. The string "Bell Atlantic" shown at **48** in Figure **3** is an example of such an object in a file. The calendar server **36** further cooperates with the processor **12** to

store a copy of this HTML file as the file **22** in the file memory **24** shown in Figure **1**.

Referring to Figures **1** and **3**, effectively the association component **20** associates a search key with the object in the file, in this case the string "Bell

5 Atlantic" **48**, and the search scheduler **18** schedules a search for information using the search key for automatic future execution by the search executor **26**.

The particular way in the particular search key is associated with the object is explained with reference to Figure **4** which shows a flowchart of the search

10 scheduler.

Referring to Figures **3** and **4**, in this embodiment, a user of the file **22** may initiate the search scheduler **18** shown in Figure **4**, by highlighting or selecting the object **48**, in this case the string 'Bell Atlantic", within the calendar display **44**, and then executing a hot key sequence on a user input device **50** shown

15 in Figure **1** to cause the processor **12** to invoke the search scheduler **18**. In this embodiment, the search scheduler tags the object **48** with an icon or object tag **52** which is inserted in the HTML file to cause it to visually appear adjacent the object **48**.

Referring to Figure **4**, block **54** of the search scheduler **18** then directs the

20 browser **28** and processor **12** to display on the monitor **46** a dialog box as shown at **56** in Figure **4**. In this embodiment, the dialog box includes a search key field **58**, a scheduled time field **60** and a search refinement field **62**. A user of the device can then populate these fields **58-62** by actuating the user input device **50** shown in Figure **1**. It will be appreciated that the user input

25 device may include a keyboard to enable the user to enter search strings, times and dates at which the search is to be performed and further search refinements. For example, the user may refine the search by adding to the refinement field **62** further text strings which must be found in either conjunction or disjunction with the contents of the search key field **58**.

30 Additionally, if permitted on the selected search engine, the user may refine

the search by entering into the refinement field **62** a date restriction, for example, to exclude any search results dating more than a month before the calendar entry with which the object is associated, in order to obtain only the most recent information relating to the object.

Alternatively, the user may specify a template which extracts particular strings from the information provided by the calendar application for use in refining the search, for example.

Referring to Figures **4** and **5**, block **64** then directs the browser **28** and processor **12** shown in Figure **1** to store an identification of the object, the contents of the search key field, the contents of the scheduled time field and the contents of the search refinement field in corresponding fields **66**, **68**, **70** and **72** of a search record **74** in a search table **76** shown in Figure **5**. Referring to Figure **2**, the search table **76** is appended or otherwise associated with the calendar user profile produced by the calendar server **36** shown in Figure **1**.

Referring to Figure **5**, the search record **74** also includes a search URL field **78** and a results URL field **80**. The search URL field is used to hold a universal resource locator identifying a search engine to be used to conduct the search. In this embodiment, the search URL field **78** is always populated with the same value, for example, a universal resource locator identifying the LYCOS (tm) search engine. It will be appreciated, however, that the dialog box shown in Figure **4** may further include a field as shown in broken outline at **82**, allowing the user to specify a particular search engine which is to be used to carry out the search. The user may enter the word GURU (tm) into the field **82** to identify the gurunet search engine, for example, which provides a reduced volume of search results, and a lookup table (not shown) may be used to specify the URL to be used to populate the corresponding search URL field **78** of the associated search record **74**. Alternatively, a field of the dialog box may include a pull-down menu allowing a user to select one or more search engines from a list.

Referring back to Figure **4**, once the search tables have been populated, the search scheduler is completed.

Referring to Figures **1** and **6**, the search executor **26** is run by the processor **12** as a background task and includes a first block **90** which directs the processor to scan the search table **76** shown in Figure **5** to determine whether or not any of the search records **74** in the search table **76** has a scheduled time field **70** identifying a time prior to or equal to a time presently indicated by a clock **92** readable by the processor **12**, and if so, whether the results URL field **80** of such a record is empty, indicating that the scheduled search has not yet been conducted. Upon finding such a search record **74**, block **94** of the search executor directs the processor to obtain a search URL from the search URL field **78** of the search record **74** and to present the search URL to the browser **28**. The browser then uses the contents of the search URL field **78** as a browser location address to cause the browser to establish communications with a search server **96** which in this embodiment is exemplified as LYCOS (tm). The search server **96** presents back to the browser **28** the usual template of search engine fields which a user would normally complete, to specify the parameters of the search, however, block **98** of the search executor directs the processor **12** to run a program, routine, or scripts **100**, for example, associated with the applet **16** to populate the search engine fields with the contents of the search key field **58** and the search refinements field **62** of the search record **74** shown in Figure **5**. Also, the program, routine or scripts cause the search to be launched at the search server **96**.

The search server **96** performs its search and provides back to the processor and browser, at least one results URL which identifies a location at which the search results may be obtained. Block **102** of the search executor directs the processor **12** to receive the results URL or URLs and block **104** directs the processor to store any such URLs in the results URL field **80** of the search record **74**. Thus, the results URL is stored in association with the object tag

identified in the object tag field **66** which is associated with the object, hence the results URL is stored in association with the object.

In this embodiment, the results URL includes a URL pointing to a "search results" web-page such as that produced by many search engines, the search results page in turn including a plurality of hyperlinks containing URLs identifying IP addresses of other web sites where information relevant to the search is located. Alternatively, however, a results URL may directly identify an IP address where relevant information is stored, rather than identifying an intermediate IP address where further URLs pointing to the information are stored. If the selected search engine is not capable of providing such a "direct" results URL, block **102** may be further modified to direct the processor to access a search results web-page identified by the supplied URL, and to copy the first five or ten URLs listed therein, for example, into the results URL field **80** of the search table **76**.

Block **106** then directs the processor to convert the object tag **52** shown in Figure **3** into a hyperlink pointing to the URL specified by the contents of the results URL field **80** in the associated search record **74** shown in Figure **5**. Block **106** further directs the processor to modify the HTML file **22** stored in the file memory **24** shown in Figure **1** by inserting this hyperlink into the file, so that the hyperlinked object tag **52** will be displayed in the user's calendar display **44**.

Consequently, referring to Figure **3**, when a user clicks on the object tag **52**, a separate frame **108** is produced, and in the separate frame, any information stored at the URL specified by the results URL is displayed. Alternatively, where a plurality of "direct" results URLs are stored in the results URL field **80**, block **106** may direct the processor to insert a plurality of respective object tags **52** into the file, each such object tag hyperlinked to a respective results URL. Or, as a further alternative, block **106** may convert the object tag **52** into an embedded menu of hyperlinks to respective results URLs, so that when

the user hovers a mouse over the displayed object tag, a small pop-up menu displaying the respective results URLs appears.

Similarly, it will be appreciated that if more than one search URL is stored in the search URL field **78** of the search record **74** shown in Figure **5**, blocks **94**, **98**, **102**, **104** and **106** may be repeated for each such search URL to execute a plurality of searches on respective search engines, and to insert one or more respective object tags **52** hyperlinked to respective results URLs.

While the above embodiment has been described in connection with the use of an HTML file initially prepared by a calendar application, it will be appreciated that the present invention may be used in connection with any file having objects with which resource locators may be associated in order to direct a user to a resource for further information. The resource may be local, such as in memory accessible directly by the processor **12** or accessible by the processor through a network connection, wireless connection, the public switched telephone network or in general any database of information which can be placed in communication with the processor **12**.

The ability to schedule the date and time of execution of the search, as indicated in Figure **4** at the date and time field **60** permits a user to specify that the search is to be performed just before an event, such as a meeting, for example, to provide the user with the latest available information just before going into the meeting, for example. Thus, the present embodiment provides a way of allowing users be automatically kept up to date in respect of matters they specify. To complement this feature, the user may further select search engines which permit searching by date range and may use the search refinements field **62** of the dialog box **56** shown in Figure **4**, to enter appropriate date restrictions into the refinements field **72** shown in Figure **5**, to exclude information dated more than a week or a month ago, for example, to obtain only the most recent "news" relating to the object. More generally, the contents of the refinements field **72** may be used to further refine a search as necessary to focus the search on particular aspects important to the user.

Also, it will be appreciated that the search table shown at **76** in Figure **5** may include a plurality of search records **74** and that more than one record may be associated with the same object tag to cause searching, for example, to be done at more than one time, for the same information.

5   It will further be appreciated that the search executor may be extended to include a further block of codes **110** shown in broken outline in Figure **6**, which directs the processor **12** shown in Figure **1** to reschedule a search by producing a new search record **74** having a different, later time value entered into the scheduled time field **70** to automatically cause a new search to be re-
10   executed at a later time. In this manner, the user can be kept up to date so that whenever the user clicks on the icon or object tag **52** shown in Figure **3**, the information obtained from the last performed search is made available to the user. This feature may be particularly useful for scheduling recurring searches for information relevant to recurring monthly or weekly meetings, for
15   example.

Although the embodiment described above involved storage of the file and user profile information locally at a user's computer, it will be appreciated that the precise location of such information, or of the location from which the search is initiated, is not important. For example, the present invention may
20   alternatively be implemented in an entirely web-based manner. A file, such as a calendar file for example, as well as the full user profile information described above in connection with Figures **2** and **5**, may be stored entirely at the server **36**. The user may access his or her calendar on-line by simply entering an identification such as a username and/or password, for example.
25   The user may then modify his calendar and right-click or strike a hot key sequence to cause the server **36** to download and execute an applet on the user's computer, the applet serving merely to allow the user to interact with a dialog box to enter the contents of the search table **76** into a storage medium at the server **36**. At the pre-scheduled time, the server **36** will initiate the
30   search as described above, and modify the contents of the user's calendar file by inserting one or more links to the search results into the calendar file. The

user may then remotely access the server **36** to view the modified calendar file stored therein and to access the links to the search results. The user may thus pre-schedule a search to be executed entirely by the server **36**, which does not require the user's computer to be turned on at the time when the search is to be performed. Such an embodiment is particularly advantageous for business travellers, who may be away from their home or office computers at the times when the search is to be performed and when they will need to access the search results. Such travellers would thus be able to schedule searches and access results from laptops, or even from public access internet terminals or kiosks located at business conference centres, for example.

While specific embodiments of the invention have been described and illustrated, such embodiments should be considered illustrative of the invention only and not as limiting the invention as construed in accordance with the accompanying claims.